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Name	Stature, Feet	Color of Flowers	Fragrance
<i>V. Chamissoniana</i>	3-5	Pink, rose, purple	
<i>Helena</i>	1-2	White, pale lavender	
var. <i>Lanaiensis</i>	1-4	Pinkish-white	
<i>helioscopia</i>	2-3	Pure waxy white	Yes
<i>Kauiensis</i>	1-3	Pale blue	
<i>Mauiensis</i>	1-2	Dark blue	
var. <i>Kohalana</i>	4-6	White to dark blue	Yes
<i>Oahuensis</i>	$\frac{1}{2}$ -1	White	
<i>robusta</i>	3-5	Pale purple	
var. <i>Mauiensis</i>	3-5	Pinkish	
var. <i>Wailenaleae</i>	3-6	White	
<i>I. pyrifolium</i>	2-3	Greenish-white	Yes
<i>longifolium</i>	6-8	Purplish-white	
<i>laurifolium</i>	2-3?		

COLLEGE OF HAWAII,
HONOLULU

A NEW HYBRID SUNFLOWER

BY T. D. A. COCKERELL

In 1895 Rydberg described a supposed species *Helianthus aridus*, which occurred in the region of *H. petiolaris* and *H. annuus lenticularis*, and appeared to be a possible hybrid between the two. Another form, known as *H. petiolaris* var. *patens* (Lehm.) Rydb., was also suspected of being a hybrid.* It was therefore particularly desirable to produce a genuine *petiolaris* \times *annuus* hybrid, for comparison with these more or less intermediate forms. My wife made the crosses last year, and this year we have the resulting plants in large numbers. The *petiolaris*, used as the seed plant, was a specially fine but typical plant raised from seed collected by Mr. D. M. Andrews in Oklahoma. The *annuus* were various, including chestnut-red (*coronatus*) forms. The *H. petiolaris* was perfectly fertile with the *annuus* pollen, and the hybrids are all alike in general appearance.

Helianthus annuus \times *petiolaris*, n. hybr.

Plants about four feet high, freely branching, the growth essentially like *petiolaris*; stems and branches hairy, more or less speckled with purple; leaves alternate, rarely opposite, the petioles about equal to the blades, or often shorter; leaf-blades with

* American Naturalist, XLIX (1915), pp. 611-613.

broad base (*annuus*-style), upper surface shiny (*petiolaris* character), the margins remotely and rather feebly dentate; smaller leaves narrower, practically entire; involucre bracts broad but tapering, the margin rather long-ciliate; disc small, 26–28 mm. diameter, dark with in some cases the white-haired center of *petiolaris* weakly indicated; rays long and ample, 34–42 mm. long, in one or two rows; achenes (immature) delicately hairy all over. When the pollen has come from a red *annuus*, the chestnut-red color appears in the hybrid, but always (on upper side) at base of rays, forming a very distinct ring or band occupying about the basal quarter of the rays. Thus the color-pattern is unlike that of *H. annuus*, and resembles rather that of *H. cucumerifolius*. On the under side of the rays the middle third shows more or less red, especially on the apical half; there is no relation between the patterns of the upper and under sides.

This hybrid is obviously not *aridus* or *patens*. If those plants are in any sense of hybrid origin, they are certainly not F₁ hybrids between *petiolaris* and *annuus*. On the other hand, the above hybrid should occur in nature, wherever the two species grow together. In the size of the flower-heads it is intermediate between the parents; in the general mode of growth and shiny leaves it is *petiolaris*, but the broad leaves with truncate base have the shape of *annuus*. The *petiolaris* color-pattern, not before known, is dominant over that of *annuus*. In all respects the plants are very like the *annuus* × *cucumerifolius* crosses previously made, and it is clear that *H. petiolaris* is a close relative of *cucumerifolius*. An important character not mentioned in current descriptions of *H. petiolaris* is the white center of the disc. This is due to the remarkable tufts of white hairs at the ends of the disc bracts, but only on those at and near the center. This character is wholly absent in all *H. annuus*. In the hybrid it is feebly indicated.

It is necessary to consider briefly the nomenclatural history of *H. petiolaris*. Nuttall described it in 1821 "from the sandy shores of the Arkansa; flowering in August." He notes that the leaves are "somewhat shining and almost destitute of serratures." The achenes are "covered with a silky and fulvous down." The flowers are about 3 or 4 inches in diameter, and the petioles and peduncles are of great length.

Twenty years later Nuttall described his *H. integrifolius*, said to closely resemble *petiolaris*, but with the lower leaves opposite and the peduncles relatively short. A variety *gracilis* had the leaves denticulate, scarcely 3-nerved, and the involucre bracts acuminate.*

In 1828 Lehmann described *Helianthus patens*, peculiar for the large heads (as compared with the common plant known as *petiolaris*), the long petioles and peduncles, and the peduncles fleshy toward the top. The leaves are shaped essentially as in *annuus*, or at any rate broader than in *petiolaris*. This, in its large heads and shape of leaf-blades, resembles our hybrid; but the latter has not especially long petioles, nor are the peduncles noticeably fleshy toward the top. In the long peduncles and petioles, and in the large heads, it resembles *H. petiolaris* as originally described. If *patens* can be separated at all from the original *petiolaris*, it must be by the broader leaves; Nuttall says of *petiolaris* and *integrifolius* both, that the leaves are "ovate or ovate-lanceolate." The original *petiolaris* appears to have been described from plants grown in Philadelphia from seed, and this may have affected its character.

It appears probable, however, that *H. integrifolius* is really the common plant of the Rocky Mountain foothills, which we know as *petiolaris*. The type of *petiolaris* may be essentially identical with *patens*, and thus we shall have to write *H. petiolaris integrifolius* (Nutt.) for the plant generally known as *petiolaris*. Suppose, however, that the original *petiolaris* and *patens* are of hybrid origin, though not F_1 hybrids of *annuus* \times *petiolaris* Auctt., what will be the nomenclatural result?

H. aridus is not, I think, a hybrid; but rather a variety of *H. annuus lenticularis*.

H. canus (Britton) Wootton & Standley is a remarkable species which used to be considered a variety of *petiolaris*. I examined a specimen in U. S. Nat. Museum from near Casas Grandes, Chihuahua (*E. W. Nelson*). The small branches and stems are densely covered with white pubescence; involucre bracts with acuminate ends; disc white in middle as in *petiolaris*.

* Trans. Amer. Phil. Soc., N. S., 8: 366. 1841.

There is much more to be said eventually about hybrid sunflowers, but some of them are very puzzling. We have a long series of plants grown from *H. annuus* pollinated by different perennial species, but showing *only annuus* characters. Other annual \times perennial crosses have given quite different results, and at present we cannot pretend to understand the various results obtained. Experiments by Sutton in England have proved no less perplexing.*

The doubling of the rows of rays in annual sunflowers appears to be an old character. La Farge, in "One Hundred Masterpieces of Painting" (1912), reproduces a painting by Van Dyck (1599-1641), in which appears a very large sunflower, with two or three rows of rays.

CONCERNING SOME SPECIES OF *CARDUUS* IN COLORADO

BY GEO. E. OSTERHOUT

A perplexing group of plants in Colorado is made up of the species of *Carduus*. There are quite a number of species and there are many forms which are intermediate, and do not conform to the descriptions of the recognized species. Dr. Rydberg accounted for many of these by recognizing them as hybrids, Bull. Torrey Club 37. But it is not certain that all these forms are hybrids, and if some of them originated in that way, in time they may have become species, and should be so recognized.

Carduus Osterhoutii Rydb., Bull. Torrey Club 32: 131.

One of the species of the high mountains accords more or less with the description of *Cirsium Hookerianum* Nutt. The type locality of this is much farther north, and Dr. Gray did not credit it to the Colorado mountains. In the Synopt. Flora N. A. he says: "Upper wooded and subalpine region of the Rocky Mountains, north of lat. 48°." There is reasonable doubt if this northern plant is found in the Colorado mountains, but Prof.

* Stand. Cyclop. Hort., 6: 3281. 1917. The *H. annuus* \times *cucumerifolius* hybrid was reported by A. Andr  e in 1913, and again (from plants grown in Sweden) by Lundstr  m in 1914. (Cf. Bot. Centralbl., 1915, No. 10, p. 242; 1916, No. 2, p. 31.) See also Journ. of Heredity, 1915, p. 545.